

MULTIMEDIA



UNIVERSITY

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MULTIMEDIA UNIVERSITY

FINAL EXAMINATION

TRIMESTER 2, 2016/2017

PEM0044 – ESSENTIAL MATHEMATICS
(All sections / Groups)

27 FEBRUARY 2017
9.00 a.m. - 11.00 a.m.
(2 Hours)

INSTRUCTIONS TO STUDENTS

1. This question paper consists of **THREE (3)** printed pages with 4 questions only, excluding the cover page.
2. Answer all **FOUR (4)** questions.
3. Write all your answers in the answer booklet provided. All necessary workings **MUST** be shown.
4. The formula sheet is attached at the end of this question paper.

Question 1 (25 Marks)

(a) Simplify $(m^2 n^{-1})^4 (3m^5 n^{-4})^{-3}$. [4 marks]

(b) Use the quadratic formula to solve $3x^2 - 5x + 2 = 0$. [6 marks]

(c) Solve the following inequality. Represent the ranges on the real number line.
 $x^2 - 10 > 3x$ [8 marks]

(d) Find an equation of the straight line passing through point (1, 2) and is parallel to the line $y + 3x = 5$. [7 marks]

Question 2 (25 Marks)

Solve the following system of linear equations by using the inverse of the coefficient matrix.

$$\begin{aligned}x + y + 2z &= 8 \\2x + y + z &= 7 \\2x + 2y + z &= 10\end{aligned}$$

(Note : No decimals is allowed in the calculation as well as in the final answer).

[25 marks]

Continued...

Question 3 (18 Marks)

(a) Given the arithmetic sequence: 5+10+15+20+...

(i) Find the first term and the common difference. [3 marks]

(ii) Find the 4th term. [3 marks]

(iii) Find the sum of the first 14 terms. [3 marks]

(b) If the second and the fifth terms of a geometric sequence are 6 and 48 respectively, find the common ratio and the 12th terms. [9 marks]

Question 4 (32 Marks)

(a) Find $f'(x)$ if $f(x) = \frac{2x-3}{x+4}$. [6 marks]

(b) Use the chain rule to find $\frac{dy}{dx}$ for the given value of x .
 $y = 2u^3 - 3u^{-2} + 1, \quad u = 2x + 3$ [9 marks]

(c) Find $f'''(x)$ if $f(x) = \frac{1}{4}x^{-2} + 8x^3 - 2x + 7$. [6 marks]

(d) Integrate $\int \left(\frac{20x^9 - 10x^6 + 5x^3}{x^3} \right) dx$. [6 marks]

(e) Evaluate $\int_2^3 (x^3 - 3x^2 + 6) dx$. [5 marks]

End of Page.

Course: Essential Mathematics

Code: PEM0044

Summary of Formulas

1. Basic Rules of Differentiation

- i) $f'(x) = 0$
- ii) $f'(x) = nx^{n-1}$
- iii) $cf(x) = cf'(x)$
- iv) $f(x) \pm g(x) = f'(x) \pm g'(x)$
- v) $f'(x) = u \frac{dv}{dx} + v \frac{du}{dx}$
- vi) $f'(x) = \frac{v \frac{du}{dx} - u \frac{dv}{dx}}{[v]^2}$
- vii) Chain rule: $\frac{dy}{dx} = \frac{dy}{du} \times \frac{du}{dx}$
- viii) General power rule: Derive $[f(x)]^n = n[f(x)]^{n-1} f'(x)$

2. Basic Rules of Integration

- i) $\int k \, du = ku + C$
- ii) $\int u^n \, du = \frac{u^{n+1}}{n+1} + C$
- iii) $\int kf(u) \, du = k \int f(u) \, du$
- iv) $\int [f(u) \pm g(u)] \, du = \int f(u) \, du + \int g(u) \, du$